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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Ju-II Lee

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EXAMINER

HOGANS, DAVID L

ART UNIT

PAPER NUMBER

2813

DATE MAILED: 11/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/669,996	Applicant(s) LEE, JU-IL	
	Examiner David L. Hogans	Art Unit 2813	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 September 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) 5-8, 10 and 11 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4 and 9 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>9-24-03</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This Office Action is in response to the Election filed on September 7, 2004.

Election/Restrictions

1. Applicant's election of Species I/Claims 1-4 and 9 in the reply filed on September 7, 2004, is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).
2. Claims 5-8, 10 and 11 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on September 7, 2004.

Priority

3. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

4. The information disclosure statement (IDS) submitted on September 24, 2003, is in compliance with the provisions of 37 CFR 1.97, and accordingly, has been considered by the examiner.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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6. Claims 3 and 4 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. For Example, Claim 4 lines 2-3 claim: "wherein the spacer block mask is formed by a mask for opening doping region for the photodiode and a negative photoresist." The Examiner is uncertain as to if the spacer block mask is formed between the mask for opening doping region and a negative photoresist or if the spacer block mask is comprised "by a mask for opening doping region of the photodiode and a negative photoresist." Finally, the Examiner is uncertain as to what "a mask for opening doping region of the photodiode" is (See Claim 3 line 3 as well).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 1-3 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over 6,166,405 to Kuriyama et al. in view of Applicant's Admitted Prior Art (hereinafter AAPA)

Claim 1

Kuriyama et al., in Figures 1-3 and columns 2-9 lines 20-54, teaches forming a field oxide (11b) for defining active area and field area on certain area of a substrate, and forming a gate of transfer transistor (12) on the active area; forming the low voltage buried photodiode (noting the object of the invention was to create a highly sensitive

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solid state imaging device) doping region (13) in alignment with one side of the gate of transfer transistor and field oxide; forming a spacer insulation layer by stacking layers of oxide (16) and nitride (15) over the whole structure; forming a spacer block mask (17b) to open areas excluding doping region for the low voltage buried photodiode; and removing the spacer block mask, and forming a floating diffusion region (14a) on other side of the transfer transistor.

Kuriyama et al. fails to teach forming an epitaxial layer on the substrate.

However, Applicant's Admitted Prior Art (hereinafter AAPA), on pages 1-3 of Applicant's specification and Figure 1, teaches forming a low voltage buried photodiode and a transfer transistor within an epitaxial layer formed over a substrate.

It would have been obvious to one of ordinary skill in the art to modify Kuriyama et al. by incorporating the formation of a low voltage buried photodiode and a transfer transistor within an epitaxial layer formed over a substrate, as taught by AAPA, because the lightly doped epitaxial layer improves performance characteristics by increasing the depth of the depletion layer.

The Examiner has not given patentable weight to the preamble limitation of "a CMOS image sensor" because "[A] claim preamble has the import that the claim as a whole suggests for it". *Bell Communications Research, Inc. v. Vitalink Communications*

Corp., 55 F.3d 615, 620 (Fed. Cir. 1995) "If the claim preamble, when read in the context of the entire claim, recites limitations of the claim, or, if the claim preamble is 'necessary to give, life, meaning, and vitality' to the claim, then the claim preamble should be construed as if in the balance of the claim." *Pitney Bowes, Inc. v. Hewlett-Packard Co.*, 182 F.3d 1298, 1305 (Fed. Cir. 1999). As the body of the claim makes no reference, nor allusion, to a CMOS image sensor (i.e. - the preamble does not recite limitations of the claim), and since the above referenced preamble limitation does not give life or meaning to the claim, it is deemed to be of no patentable weight. See MPEP § 2111.02

Claim 2

Incorporating all arguments of Claim 1 and noting that Kuriyama et al., in Figures 1-3 and columns 2-9 lines 20-54, teaches wherein the oxide layer has a thickness ranging from about 200A to about 2000A, and the nitride layer has a thickness ranging from about 200A to about 1000A.

Claim 3 (As best understood)

Incorporating all arguments of Claim 1 and noting that Kuriyama et al., in Figures 1-3 and columns 2-9 lines 20-54, teaches wherein part b) further comprises: sequentially performing n-type ion implantation and p-type ion implantation using a mask for opening doping region of the low voltage buried photodiode.

Claim 9

Incorporating all arguments of Claim 1 and noting that Kuriyama et al. fails to explicitly teach the formation of a CMOS image sensor.

However, AAPA, on pages 1-3 of Applicant's specification, teaches wherein a CMOS image sensor is formed.

It would have been obvious to one of ordinary skill in the art to modify Kuriyama et al. by incorporating the formation of a CMOS image sensor, as taught by AAPA, to reduce power consumption as compared to other MOS technologies, since power is only consumed during the logic switching cycle of CMOS technology and not in static conditions.

9. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over 6,166,405 to Kuriyama et al. in view of AAPA, as applied to claims 1 and 3 above, and further in view of Microchip Fabrication (2000) to Van Zant.

Claim 4 (As best understood)

Incorporating all arguments of Claims 1 and 3 above, and noting that Kuriyama et al. teaches a resist (17b) formed over the photodiode area but fails to explicitly teach a negative photoresist formed over the photodiode area.

However, Van Zant, on pages 244-245, teaches that there are two types of photoresist, negative and positive.

It would have been obvious to one of ordinary skill in the art to modify Kuriyama et al. and AAPA by incorporating the formation of a negative photoresist, as taught by Van Zant, because the dissolving rate between the polymerized and unpolymerized regions is high, therefore, little content of the polymerized region is lost during the development step (i.e. – the remaining mask maintains good coverage over the desired protected region).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David L. Hogans whose telephone number is (571) 272-1691. The examiner can normally be reached on M-F (7:30-4:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead Jr. can be reached on (571) 272-1702. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DH *DA*

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